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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,044	03/23/2004	Ronald J. Enzweiler	ITFT-PPC100US	2696
23122	7590	09/12/2006	EXAMINER FORTUNA, ANA M	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			ART UNIT 1723	PAPER NUMBER

DATE MAILED: 09/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/807,044	Applicant(s) ENZWEILER ET AL.	
	Examiner Ana M. Fortuna	Art Unit 1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
 4a) Of the above claim(s) 38-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/27/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-37, drawn to a process of desalinating a solution, classified in class 210, subclass 652.
 - II. Claims 38-48, drawn to a system including semi-permeable membranes, classified in class 210, subclass 195.2.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus of group II can be used for production of ultra-pure water for semiconductor applications, sea water treatment, sludge treatment, etc.
3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.
4. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required

because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Robert P. Seitter on 8/28/06 a provisional election was made with traverse to prosecute the invention of group I, claim 1-37.

Affirmation of this election must be made by applicant in replying to this Office action.

Claims 38-48 are withdrawn from further consideration by the examiner, 37

CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

7. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 is unclear, the claim recites, "bypassing the first semipermeable membrane", and also "introducing the solution to the first semipermeable membrane". The claim is indefinite as to whether "directing a portion of the feed water to the second semi-permeable membrane (34) is intended (see Fig. 3).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 7-11, 14, 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Al-Samadi et al (US 5,501,798)(hereinafter patent '798).

Patent '798 teaches desalinating a solution containing sparingly soluble solutes (see column 1, second paragraph), by treating the solution with a first and a second semipermeable membranes e.g. ultrafiltration and reverse osmosis, and adding inorganic seed to form nucleating sites for the sparingly soluble salts to precipitate on (see column 9, lines 32-38; column 3, lines 7-33, and Fig. 2, elements 24 and 14). Returning or recycling the retentate from the first semipermeable membrane back to the membrane e.g. via a feed tank (2), is also disclosed in the patent.

As to claim 2, recycling concentrate from the second semi-permeable membrane (14), back the first membrane (24) is further discloses (see fig. 2, element 54). Recycling retentate from the second membrane back to the feed conduit is also disclosed (see Fig.3) directly to the feed conduit

As to claim 3, patent '798 teaches heating the concentrate from the first membrane before mixing with the feed solution (see element HE, and 44), the recycled retentate from the membrane (34) inherently heat the feed solution.

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Regarding claim 7, the second semi-permeable membrane is disclosed as a reverse osmosis membrane (see element 14, Fig. 2).

Limitations of claims 8-9 e.g. membrane configuration is disclosed by patent '798 (see column 7, lines 57-65).

The sparingly soluble solutes of claim 10 (salts) are disclosed in '798 (see column 1, lines 22-27).

The seed or nucleation crystals, as claimed in claim 11, are disclosed in '798 (see column 11, claim 11).

Regarding claim 14, patent '798 teaches a recovery higher than 90 % (see column 2, lines 47-51).

As to claim 16, this patent teaches ground water, e.g. water wells or aquifers (see column 1, lines 15-21).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 5, 6, 12, 13, 15 18-21, 25-26, 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Al-Samadi et al (US 5,0501,798). Patent '798, discussed in the paragraph above teaches, regarding claim 6, and additional embodiment in which the first semi-permeable membrane is a reverse osmosis or a nanofiltration membrane (RO, NF) (See fig.1), therefore, using NF in place of microfiltration membrane it would

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have been obvious to one skilled in the art at the time this invention was made, because the nanofiltration or reverse osmosis membrane use in the first stage (Fig. 1) in the process of '798 is not fouled by the sparingly soluble solid (see column 8, lines 50-66). It would have been obvious to one skilled in the art at the time this invention was made to alternatively select NF as a pretreatment membrane based on the inherent membrane capability for removing divalent ions, e.g. sulfates, which produce a permeate of higher quality than in the microfiltration, and which when combined with a final reverse osmosis treatment, as suggested in '798 (fig. 2), the skilled in the art can expect the production of water with better quality.

As to claim 12, the water sources to be treated in the process of '798 are not limited and include sources with high level of dissolved solids, e.g. wells, aquifers, industrial wastewater (see column 1, lines 1-30). As to claim 13, the solid concentration of the water resulting from the reverse osmosis treatment is not disclosed in patent '798, since, both the present invention and the reference are not limited of a particular membrane, selecting a tight reverse osmosis available in the market e.g. a high salt rejection membrane a high quality of drinking water quality can be obtained. Combining an additional semi-permeable membrane, to treat water from the NF membrane (Fig. 1) will be cumulative to improve permeate or treated water quality.

As to claim 5, desupersaturation e.g. treatment of the concentrate prior to recycling back to the feed is disclosed in '798 (Fig. 1, elements 30, 34, 36).

Applying a solid removal step to desaturate the concentrated feed containing seed crystal, e.g. to control the rate of precipitation of solids in the feed it would have been

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obvious to the skilled in the art at the time this invention was made based on '798, which applies two desaturation stages to the concentrate from the first semipermeable membrane e.g. microfiltration and solid separation with filter press, hydroclave, etc (elements 24, 34).

Claim 18 further add fractionation of the first concentrate from the first semipermeable membrane and recirculation of portions of these streams into the feed to the first semipermeable membranes. Patent '798 suggests performing more than one solid separation on the concentrate from the first semipermeable membrane separation, with recycling of the majority fraction, and liquid portion separated from the minority fraction (see separation on elements 24 and 34, and respective recycling, Fig. 1). The combination of the suggested steps I fig. 1, and Fig. 2 of patent '798, in which a pre-treatment with a semipermeable membrane before a final reverse osmosis membrane treatment is disclosed, it would have been obvious to one skilled in this art at the time this invention was made, patent '798 teaches improving the performance of the reverse osmosis membrane by pretreatment with an ultrafiltration or microfiltration (see column 5, lines 45-64).

Limitations of claims 22-23 correspond with the limitations of claims 2-3; claims 25-34 correspond to the limitations with claims 5-14; claim 36 correspond with the limitation claim 16, discussed in this paragraph or the paragraph above.

12. Claims 15 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Al-Samadi et al (US 5,501,798) as applied to claims 1 and 18 above, and further in

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view of Lee et al (Low-pressure RO membrane desalination of agricultural drainage water).

Patent '798, discussed above, fails to teach using the method for treatment of agricultural drainage water

Lee et al teaches using the seeding pretreatment method in combination with reverse osmosis or nanofiltration membranes and including concentrate recycling (Abstract, page 4, Fig. The concentration of dissolved solids on the feed is also disclosed (see table 1). Production of a permeate with low total dissolved solids and using membranes with high salt rejection is suggested by Lee et al (see Table 2, page 4, page 6-7). Lee further suggests use of multiple membrane stages (RO or NF) (see page 8, columns 1-2). It would have been obvious to one skilled in the art at the time this invention was made to use the process of '798 for treating other water sources containing sparingly soluble solids, such as agricultural drainage water, based on the teaching of Lee et al.

12. Claims 4, 17, 24, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Al-Samadi et al (US 5,501,798) as applied to claims 1, 18 above and further in view of Hess et al (Field Demonstration of Wastewater concentration by Seeded Reverse osmosis). Patent '798, discussed above teaches applying his process to industrial waste waters, but does not clearly teaches "brine". Hess et al teaches treatment of brine from power plants by introducing seed crystal to induce preferential precipitation of scaling components of the seed and treating the brine by reverse osmosis (entire article). Although no plugging of the reverse osmosis membrane when

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treated by the R O membrane without pre-treatment was found, one skilled in the art at the time this invention was made would have been motivated to expect better reverse osmosis performance when pretreating the seeded feed stream with microfiltration membrane, as taught by patent '798. Less pressure requirement and better product water from the RO membrane can be expected when the MF treatment is performed before the RO.

Hess et al further teaches using multiple membranes (see article).

Regarding claims 4, and 24, alternatively directing the feed to the final membrane stage it would have been obvious to one skilled in the art at the time this invention was made, because Hess et al teaches that there is not plugging effect in the reverse osmosis (second semi-permeable membrane), by contacting the membrane with the seed crystal added feed stream near saturation level e.g. concentration between 1,000 to 20,000 mg/l. The later reference achieves a 95 % recovery and water with 100 to 1000 mg/l of TDS (see page 7-1, field test results), improvement to those results should be expected by the skilled artisan when reducing part of the solids by a microfiltration stage or nanofiltration stage, as suggested in patent 798.

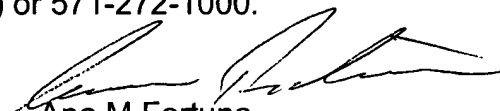
Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited references show the conventionality of seeding to remove scaling agents e.g. sulfates, carbonates, etc., and removal of the solids by reverse osmosis, nanofiltration or microfiltration membranes. The specific scale agents and seed are also disclosed in the art.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M. Fortuna whose telephone number is (571) 272-1141. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ana M Fortuna
Primary Examiner
Art Unit 1723

AF
September 8, 2006